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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,831	07/20/2005	Markus Turtinen	P/1805-17	1099

2352 7590 10/01/2007  
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EXAMINER
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REDDING, THOMAS M

ART UNIT	PAPER NUMBER
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2624

MAIL DATE	DELIVERY MODE
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10/01/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/526,831

Applicant(s)

TURTINEN ET AL.

Examiner

Thomas M. Redding

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____                                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u>                                    | 6) <input type="checkbox"/> Other: ____                           |

Continuation of Attachment(s) 3. Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :4/30/2007,12/21/2006,11/10/2005,3/3/2005.

## **DETAILED ACTION**

### ***Specification***

1. The specification in its current form is without section headings for the Summary of the Invention, Brief Description of the Drawings and the Detailed Description of the Invention. The examiner suggests that the applicant update the specification to conform to customary US practice.

### ***Claim Objections***

2. Claim 2 is objected to because of the following informalities: Claim 2 states an example within the claim. "Description of examples or preferences is properly set forth in the specification rather than the claims. If stated in the claims, examples and preferences >may< lead to confusion over the intended scope of a claim." MPEP §2173.05(d). Appropriate correction is required.

Claim 3 is objected to because of the following informalities: Claim 3 uses the acronym LBP without providing a definition. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1–3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pang et al. (US 6,804,381 B2) in combination with Kuhner et al. (US 2002/0164070 A1).

Regarding claim 1, Pang teaches [a] method for characterising features of paper based on computer vision ("The present invention relates to a method for automated defect detection in textured materials", column 1, line 9, "Automated manufacture requires automated inspection of industrial materials, such as textile, paper, and plastic", column 1, line 15).

Pang does not teach a method characterised in that from pictures of numerous paper samples are extracted multi-dimensional features describing features of paper; the said features are entered as input into a learning classifier operating in an unsupervised manner, which produces a projection of the said data of each picture part in a low-dimension space, so that paper grades having close properties produce close projections in the low-dimension space and the classification results projected in the low-dimension space are used to aid classification.

Kuhner, working in a similar field of endeavor of classification and analysis of data does teach a method characterised in that from pictures of numerous paper samples ("The pattern recognition construction process 100 analyzes a group of data objects defining a data set 102", Kuhner, paragraph 52) are extracted multi-dimensional features describing features of paper ("For example, if a data object comprises an image, then a feature may include hue, saturation, intensity, texture, shape, or a distance between two pixels", Kuhner, paragraph 42); the said features are entered as input into a learning classifier operating in an unsupervised manner ("The training of classifiers may be accomplished using either supervised or unsupervised techniques", Kuhner, paragraph 154), which produces a projection of the said data of each picture part in a low-dimension space, so that paper grades having close properties produce close projections in the low-dimension space and the classification results projected in the low-dimension space are used to aid classification ("Examples of some classification approaches that may be implemented include clustering, ..., principal component analysis, ..., exhaustive combination methods (ECM), single feature classification performance ordering (SFCPO), Fisher projection space (FPS), and other decision tree approaches", Kuhner, paragraph 156, the techniques listed seek out lower dimensional feature spaces for classification).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to use the classification techniques of Kuhner with the inspection system of Pang to analyze data where "the information being analyzed is not easily susceptible to quantitative description" (Kuhner, paragraph 7).

Regarding claim 2, the combination of Pang and Kuhner teaches the said learning system operating in an unsupervised manner is an unsupervised clustering method or its simulation, for example, a SOM (Self- Organising Map) ("The training of classifiers may be accomplished using either supervised or unsupervised techniques", Kuhner, paragraph 154).

Regarding claim 3, the combination of Pang and Kuhner teaches [a] method for characterising paper as claimed in claim 1 (see above), characterised in that the feature describing the paper samples is a LBP or a bit pattern feature derived from it ("The next stage is the thresholding of the fused image output to generate a binary image of defects  $B(x, y)$ . A threshold value can be selected so that any value below this limit is considered to belong to a regular texture under inspection and any value above the limit is contributed from defects", Pang, column 11, line 50 and figure 8, Pang is referring to a binary pattern in a windows image)

Regarding claim 7, the combination of Pang and Kuhner teaches [a] system for classifying paper using computer vision, characterised in that the system comprises imaging means (Pang, figure 1 schematically shows a camera), means for extracting the features describing paper quality from an image of the paper ("the feature process 104 may be implemented as a feature module", Kuhner, paragraph 51), and means for unsupervised learning classification into a space with a low-dimension space compared with the feature space ("Examples of some classification approaches that may be implemented include clustering, ..., principal component analysis, ..., exhaustive combination methods (ECM), single feature classification performance ordering (SFCPO), Fisher projection space (FPS), and other decision tree approaches", Kuhner, paragraph 156, the techniques listed seek out lower dimensional feature spaces for classification).

5. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pang et al. (US 6,804,381 B2) and Kuhner et al. (US 2002/0164070 A1) in combination with Chase (US 5,013,403).

Regarding claim 4, the combination of Pang and Kuhner teach the elements of claim 1 as given above.

Pang and Kuhner do not teach paper is in addition imaged and classified at different stages of its manufacture.



Chase, working in the same field of endeavor of on-line measurement of paper quality during production, does teach paper is in addition classified at different stages of its manufacture ("papermaking machines have been instrumented to include sensors to detect parameters such as wire speed, basis weight, moisture content, and caliper of the paper during production", Chase, column 3, line 58 and figures 1 and 7, Chase teaches the concept of making measurements at different points in the papermaking machine corresponding to different stages of manufacture).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to use the multiple location testing method of Chase with the paper inspection system of Pang and Kuhner in order to control the paper making process to produce paper of a desired grade ("Once functional relationships employing the process measurement proxies are determined by computer 201 of FIG. 8, papermaking can be controlled by monitoring the process measurement proxies. For example, after a particular grade of paper is identified, sensor 125 operates in conjunction with other selected sensors to provide process measurement proxies as digital input signals to computer 201 which, ultimately, provides output signals that indicate changes in the strength of web 113", Chase, column 14, line 56).

Regarding claim 5, the combination of Pang, Kuhner and Chase teach the samples imaged at different stages of the manufacture are processed further by means of the unsupervised learning classifier ("The training of classifiers may be accomplished using either supervised or unsupervised techniques", Kuhner, paragraph 154) in such a way that the classification will also concern the progressing of the manufacturing process ("papermaking can be controlled by monitoring the process measurement proxies", Chase, column 14, line 58).

Regarding claim 6, while Chase as part of the combination of Pang, Kuhner and Chase teaches the concept of classifying paper at different stages of manufacture as described in claim 4 above, the combination as applied to claim 4 does not teach using additional non-image information as input to the classification system.

However, Chase does teach the use of non-image process parameters and/or measurement results as input ("papermaking machines have been instrumented to include sensors to detect parameters such as wire speed, basis weight, moisture content, and caliper of the paper during production", Chase, column 3, line 58 and figure 7).

It would have been obvious at the time the invention was made for one of ordinary skill in the art to further modify the combination of Pang, Kuhner and Chase as applied to claim 4 to include the various non-imaging measurements and parameters of Chase in order to "to provide improved on-line systems and methods for non-

Art Unit: 2624

destructively detecting process measurement proxies for strength properties of paper sheet materials during manufacture" (Chase, column 4, line 58).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas M. Redding whose telephone number is (571) 270-1579. The examiner can normally be reached on Mon - Fri 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TMR/

  
**BRIAN WERNER**  
**SUPERVISORY PATENT EXAMINER**